Entrepreneurship and innovation: public policy frameworks.

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Abstract:

The purpose of this paper is to identify and unravel the disparate views toward innovation prevalent within the economic community and to link them to the various public policy approaches. These various schools of thought, or ways of thinking about the economy in general and the role of entrepreneurship and innovation in particular, not only shape how innovation and entrepreneurial activity are valued, but also the overall policy debate concerning innovation and entrepreneurship. Unraveling of these views highlights the disparate way in which entrepreneurial activity leading to innovation is valued.

Keywords: entrepreneurship | innovation | economic theory | technology | public policy | economics

Article:

1 Introduction

Valuation of entrepreneurial activity and its concomitant innovative output involves something of an oxymoron. By its very definition, entrepreneurial activity that may result in innovation is inherently uncertain and therefore difficult to measure and precisely value. The way that someone thinks about the value of entrepreneurship along with the ensuing innovative activity is shaped by the framework or model, be it explicit or implicit, underlying his or her views. This is just as true for professional economists as it is for policymakers and practitioners. If there were only a singular underlying framework or view there would be more of a consensus concerning the role and value of entrepreneurship and innovation, as well as the appropriate public policy stance to encourage both. We raise this issue for two reasons. The first, it is of scholarly interest, and the second, it relates in concept to how one values an entrepreneurial enterprise meaning a

new venture that has yet to generate a revenue stream (Audretsch and Link 2012).

However, there is anything but unanimity when it comes to economic thinking about the role—and therefore the economic value—of innovative activity in the economy either in general terms or in specific terms of an innovative activity that leads to an entrepreneurial enterprise.1 This ambiguity is reflected by disparate approaches toward public policy. The lack of convergence toward a singular model or framework for understanding the role of entrepreneurship and innovative activity in the economy has resulted in what must seem like a Tower of Babel in the professional pronouncements of economists and policymakers alike on entrepreneurship and innovation.

Despite the confusion generated by disparate views of how the economy actually works and therefore how entrepreneurship and innovation should be valued—and valuing entrepreneurship and innovation is at the heart of valuing an entrepreneurial enterprise—the importance of the economic doctrines underlying the prevalent frameworks for thinking about the economy should not be underestimated. As John Maynard Keynes once observed:

The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. (1935, p. 376)

The purpose of this paper is to identify and unravel the disparate views toward innovation prevalent within the economic community and to link them to the various public policy approaches.2 These various schools of thought, or ways of thinking about the economy in general and the role of entrepreneurship and innovation in particular, not only shape how innovation and entrepreneurial activity are valued, but also the overall policy debate concerning innovation and entrepreneurship. Unraveling of these views highlights the disparate way in which entrepreneurial activity leading to innovation is valued.

In the Section II of this paper, the main economic doctrines are introduced and put into the context of the historical, social, and economic forces that gave birth to their unique approach to understanding and analyzing the economy. In Section III, the neoclassical model of economics and the role that entrepreneurship and innovation play are explained. The Keynesian framework of economics, along with its views toward innovation and entrepreneurship, follows in Section IV. In Section V, the framework of Schumpeterian economics and its central focus on innovation and entrepreneurship is explained. Section VI compares and contrasts the role of public policy in promoting entrepreneurship innovation under each of these economic doctrines. In the final section a summary and conclusion are provided. In particular, this paper finds that much of the confusion and ambiguity in the public policy debates concerning the role of innovation and entrepreneurship reflects the thinking and guidance of traditional economic frameworks that do not have a central focus on innovation and entrepreneurship.

2 Economic frameworks for valuing entrepreneurship and innovation

There are three main or dominant modes that have shaped thinking about economics and therefore have provided the intellectual underpinning for valuing entrepreneurship and innovation. These economic doctrines are commonly referred to as neoclassical economics, Keynesian economics, and Schumpeterian economics. Each of these views or frameworks

provides a coherent, logical, and consistent way of thinking about and analyzing the economy.

These disparate views of economics vary in a number of fundamental ways. First, they differ on what they consider is of primary importance in the economy. Second, they differ on the mechanisms that influence the primary focus. And third, they differ on the appropriate stance and role for public policy. It is important to recognize that these prevailing economic doctrines compete for the attention and allegiance of policymakers, both in the United States as well as elsewhere in the world. It is also important to recognize that the role of entrepreneurship and innovation differ considerably across these main economic frameworks.

One of the reasons why such disparate views toward the role of entrepreneurship and innovation exist within these three economic frameworks is that they did not emerge in an intellectual vacuum. Rather, they coalesced around a set of political, economic, and social forces within a particular historical context. The Zeitgeist of a particular era profoundly shapes the dominant thinking and what ultimately emerges as a fundamental economic doctrine. For example, prior to World War II, the dominant economic doctrine was classical economics, drawing directly on the work and ideas of Adam Smith and David Ricardo. A fundamental feature, even belief, of classical economics was the primacy of unfettered private markets, which allowed for minimalist government intervention.

However, with the onset of the Great Depression in the 1930s, which brought unemployment to one-quarter of the workforce as well as persistently low—even negative—rates of economic growth, the prevalent doctrine of neoclassical economics gave way to a new view of the economy known as Keynesian economics. Following the Great Depression and World War II, Keynesian economics emphasized using federal government spending and other public policies to spur demand and manage the business cycle. The extent to which Keynesian economics had emerged as the dominant paradigm in the post-war era was evident in 1971, when President Richard Nixon proclaimed, “We are all Keynesians now.”

An historical irony of President Nixon’s blanket acknowledgment of the pervasiveness of Keynesian economics was that the theory was on the brink of collapse. Once again, the social, economic, and political landscapes changed. Within months of President Nixon’s declaration, severe inflation and simultaneous high unemployment hit the United States in what famously became referred to by the term stagflation. The Keynesian policy prescription—managing aggregate demand or spending in the economy—was only able to mitigate one of the problems while aggravating the other; this became known as a policy tradeoff between inflation and unemployment.

Rather than accept the pessimistic view and policy tradeoff, economists developed a new doctrine, which at the time was known as supply-side economics. This new approach shifted focus from the aggregate demand or spending side of the economy to the economy’s ability to supply goods and services—the supply side.

As emphasized in the following sections, neither the neoclassical nor the Keynesian view focuses on the role of entrepreneurship and innovation. However, as the era of globalization emerged in the 1990s and continued into this century, innovation seemed to become more of a central strategy to generate competitiveness in globally linked markets. Certainly the European Council of Lisbon of 2000 identified innovation as the key to economic growth and job creation in Europe. The increased attention to the importance of entrepreneurship and innovation led to at least the beginnings of a new economic doctrine that focused on the centrality of these concepts.

While the intellectual underpinnings date back at least to Schumpeter, the focus of the so-called Schumpeterian framework is on the ability of the economy to engage in innovative activity in order to generate economic growth and employment.

3 Neoclassical economics framework

Neoclassical economics has its intellectual roots in Smith's 1776 treatise An Inquiry into the Nature and Causes of the Wealth of Nations. The major concern of neoclassical economics is the allocation of resources to maximize, in a static sense, the economic well-being of the population, given the distributions of wealth and income. Thus, neoclassical economics focuses on markets and prices as the mechanisms that allocate scarce resources to produce the goods and services that satisfy (unlimited) consumer wants. In fact, a distinguishing feature of neoclassical economics is the centrality of market-determined price signals.

The market is so central to the neoclassical economic framework because it is the sole institution generating the prices upon which individuals and firms base their decisions. The decision making of firms and individuals is assumed to be rational. Individuals rely on market-generated prices to make their consumption and work decisions, and firms respond through their decisions about what to produce and how to produce it. The assumption of rationality in the neoclassical economic doctrine ensures that decision makers will place primacy on prices in making their decisions. As prices change, so too will their decisions. Thus, according to Laffer (2008, p. 1), inherent in neoclassical economics "is a recognition that people change their behavior when marginal incentives change."

In understanding and analyzing the economy, neoclassical economics prefers the application of abstract mathematical models rather than detailed studies of actual individuals, businesses, industries, regions, or entire national economies. Such abstract neoclassical models almost inevitably revolve around the maximizing behavior of individuals and firms in responding rationally to market-determined price signals. The primacy of market-determined prices in driving the decision making of individuals—both as consumers and as workers—and firms leaves little room for understanding or analyzing decisions about innovative activity, which often involve the creation of markets that do not even exist at that time.

Thus, innovative activity seems to be peripheral in the neoclassical economic framework because it falls outside of existing markets and their prices. Ideas and visions that lie within the dreams and aspirations of men and women are not conducive to static equilibrium models revolving around maximizing behavior of individuals. The assumption of perfect information and knowledge inherent in the neoclassical framework assumes away the most crucial dimensions driving innovative activity.

A key implication of the assumptions underlying the neoclassical economic doctrine is that the essential elements—prices and markets—tend to become obscured across countries. Particularly in the contemporary era of rapidly globalizing economies, where global markets replace regional and national markets, neoclassical economics has the peculiar feature of rendering local or national institutions as irrelevant or at least not particularly important. Thus, neoclassical economists tend to acknowledge few essential institutional differences across national contexts, since the laws of neoclassical economics are considered to apply in the same way to all country contexts at all points of time. That is, time and space do not play a central role in explaining or

understanding economic phenomena. Rather, the primacy of prices and markets and their role in shaping the decisions of individuals and firms drive economic phenomena. As Atkinson and Audretsch point out:

It is for this reason that neoclassical economics largely overlooks factors such as economic history, culture, norms, and institutions, preferring instead to dwell in the more universal world of prices, costs, and mathematical models. It is also for this reason that most neoclassical economists reject the notion of a new economy emerging in the last decade, because for them, the economy is still based on price signals and supply and demand. (2010, p. 6)

The economy is working well, and the economic goal is attained when allocative efficiency is realized. This suggests maximum consumer satisfaction, given an endowment of resources, is obtained. The presumed rationality of individual decision making is interpreted as tantamount to the public interest. As Smith instructed, an individual who "intends only his own gain" through rational maximization of utility will inevitably be "led by an invisible hand to promote… the public interest" (2000, p. 23).

Thus, in the neoclassical economic framework, the focus is on static equilibrium and the use of markets to allocate resources. This leaves little room for the analysis or understanding of entrepreneurship and innovation.

According to neoclassical economics, public policy has little role—other than minimizing government-induced distortions in markets—in ensuring that the economy is performing at a high level. There are two main reasons for this minimalist view. The first is that unfettered market forces ensure that the economy tends toward a high-performance equilibrium. As long as there is competition, the forces of supply and demand will generate market prices that will induce consumers and producers to act in ways that move the economy toward equilibrium. Prices of unemployed or underemployed resources, such as labor, will tend to fall, inducing producers to utilize them. One acknowledged role for government policy is to ensure that any artificially created barriers to entry or impediments to equilibrating markets are eliminated or mitigated. So long as there are no impediments or barriers to the process of markets equilibrating, there is no mandate or need for government intervention.

The second reason for limiting government's role is that even when economic performance is not satisfactory, such as times of high unemployment or low growth rates, government intervention is essentially futile. The prevalent view among neoclassical economics is that government policy can do little to influence the supply side of the economy with the exception of minimizing government-induced distortions in markets. In other words, "although economists can tell the government much about how to influence aggregate demand, they can tell it precious little about how to influence aggregate supply. Let no supply-sider tell you differently" (Blinder 1987, p. 107).

What Blinder is referring to with the term supply-sider is an offshoot from the neoclassical economic doctrine that differs not in the assumptions, analyses, methods, and focus of the neoclassical economic framework, but rather the main public policy prescriptions. Whereas the mainstream neoclassical economic view demands minimalist government intervention, supply-side economics advocates an active public policy role to minimize it. The thinking is that taxes imposed on individuals and firms distort market-generated incentives to produce. In particular, it is the marginal tax rates on the wealthiest individuals that exert the greatest dampening impact on productivity, because the wealthiest individuals after all are the most productive and

contribute the most to the productivity of the economy.

Thus, the supply-side economics variant of the neoclassical doctrine focuses the lens of analysis on tax rates, particularly those imposed on the wealthiest individuals. As Blinder advocates, “Every tax influences incentives, as supply-siders correctly emphasize…. Unless the market is malfunctioning, such tax-induced redirections of resources reduce economic efficiency. They are therefore to be minimized” (1987, p. 162).

While the primary focus of the neoclassical economic model is on efficiency in a static sense, both in terms of allocative and productive efficiency, there are also strong implications for economic growth. Nobel laureate Robert Solow (1956) offered insight into economic growth using the framework of neoclassical economics. While two factors, labor and physical capital, determine the level of output in an economy, it is investments in the capital which increases economic growth. Thus, the key to increasing economic growth lies in increasing the stock of physical capital, or investments in plant and equipment. The neoclassical model of economic growth thus framed public policy to focus on targets and instruments that would promote investment in physical capital, such as interest rates and tax depreciation rates for investment.

It would not be quite accurate to say that innovation plays no role in the neoclassical growth model. In fact, Solow did point out that what he termed technological change made an important contribution to economic growth. However, the contribution of technological change occurs outside of his explicit growth model and was attributed to the residual, or what could not be explained by the model. Innovation was deemed important but essentially exogenous and unexplained, or outside of the realm of understanding provided by the neoclassical growth model. Thus, rather than being deterministic, in one of the most famous passages of economics, technological change falls like manna from heaven.

The supply-side economics offshoot of the neoclassical economic doctrine places an emphasis on policies that create incentives for consumers to save rather than consume. Such savings increase the supply of funds available for capital investment, which in turn lowers the price of borrowing, or the interest rate, to make such investments in capital. Supply-side economists, such as Mankiw, who served as the head of the Council of Economic Advisors under President George W. Bush, is quick to link lower taxes to higher rates of growth: “In the long run, lower tax rates expand the supply side of the economy by enhancing the incentives for work, saving, and investment” (2004, p. 2).

Seen through the lens of the supply-side economics branch of the neoclassical doctrine, the focus and debate involves the interest rate and incentives to save rather than spend. Orszag, who served as director of the Office of Management and Budget, articulated the importance of incentives to save:

The fundamental benefit of higher national savings—achieved by preserving a substantial portion of the projected budget surplus—is that it will expand economic output in the future. Higher national saving leads to higher investment, which means that future workers have more capital with which to work and are more productive as a result. (2004, p. 2)

The neoclassical framework is in fact the most dominant and prevalent economic view in the United States. Given its widespread acceptance, what is viewed as the economic mainstream has had a profound impact on shaping the public policy debate, both in terms of the issues considered legitimate public policy concerns as well as the appropriate policy responses and

interventions. The neoclassical view has provided the intellectual mandate for a laissez-faire approach to the economy, where government intervention is the exception and occurs only as a last resort. The power of the neoclassical economic framework and its public policy stance has shaped the policy debate not only in the United States but throughout the world. As the Wall Street Journal reports: “Since the end of the Cold War, the world’s powers have generally agreed on the wisdom of letting market competition—more than government planning—shape economic outcomes” (Dean et al. 2010).

However, the neoclassical economic framework has little interest in or focus on the role of entrepreneurship and innovation. According to Mandel, who served as the chief economist of BusinessWeek:

Neoclassical economists are capital fundamentalists who believe that savings and investment in physical capital and (sometimes) human capital are the only forces driving growth. They generally ignore or minimize the role of technology. (2004, p. 1)

In his critique of the neoclassical economic framework, Mandel points out that in Milton Friedman’s best-selling 1979 book Free to Choose, the term technology does not appear a single time in the index. Mandel suggests this is a reliable indicator of the (lack of) priority assigned to technology and innovation, not just by Friedman, but by the entire doctrine of neoclassical economics (Friedman and Friedman 1979). After a careful and critical reading, Mandel concludes that:

For the most part, neoclassical economists remain profoundly ambivalent or even hostile toward most areas of technology…. They grudgingly acknowledge the importance of technological change, but they don’t understand it. (2004, p. 1)

4 The Keynesian framework

Keynes and his disciples provided an intellectual response to the economic conditions imposed by the Great Depression of the 1930s. The classical doctrine in economics was that full employment equilibrium would prevail in the equilibrium. After the stock market crash of 1929 and the subsequent drop in gross domestic product, combined with unemployment affecting around one-quarter of the work force, Keynes responded that in the long run we are all dead. Waiting for markets to restore the economy to full employment seemed less and less like a viable policy option.

Rather than focus on individual markets as the key to economic performance, the framework of Keynesian economics instead shifts the lens of analysis to the total amount of spending, or aggregate demand, in the economy. Too little spending results in low levels of output and high rates of unemployment; too much spending results in inflation. With its central focus on the aggregate demand side of the economy, Keynesian economics takes a radically different view of the role of public policy. Public policy should be responsible for managing aggregate demand, principally through fiscal policy and monetary policy. Fiscal policy includes two main instruments, government spending and taxes. By contrast, monetary policy refers to the money supply, which is managed by the Federal Reserve. Thus, the policy prescription for more economic growth is expansionary fiscal and monetary policies.

The economic crisis of 2008 reflected a sharp drop in aggregate demand due to the failure of banks and other financial institutions, which in turn triggered a drastic drop in wealth in the

United States. It was not surprising that the Keynesian policy prescription to restore aggregate demand through stimulus policies became the focal point of the public policy debate. The focus of this debate was on the demand side of the economy. The framework of Keynesian economics has virtually nothing to say about the supply side of the economy, or the ability of the economy to produce goods and services.

Krugman, a leading Keynesian economist, emphasizes that influencing the demand side of the economy should be a priority of government policy, not because the demand side is more important than the supply side of the economy, but because "productivity growth is the single most important factor affecting our economic well-being. But it is not a policy issue, because we are not going to do anything about it" (Krugman 1990, p. 18)

Thus, as under the neoclassical economic framework, Keynesian economics is little concerned with entrepreneurship and innovation. The primacy of the demand side of the economy preempts concern with or attention to key economic phenomena such as entrepreneurship and innovation, which ultimately shape the capacity of an economy to grow, provide jobs, and compete in globalized markets.

5 The Schumpeterian framework

Just as Smith provided the intellectual underpinnings for classical economics (which gave rise to its contemporary offshoot, neoclassical economics) and Keynes provided the intellectual framework for Keynesian economics, no doubt Joseph Schumpeter is the father of innovation economics. In Capitalism, Socialism and Democracy, Schumpeter (1942) shifted the lens of analysis away from the neoclassical emphasis on market-generated static equilibrium and also away from the Keynesian focus on aggregate demand. Instead, Schumpeter put the focus squarely on innovation.

Innovation is first and foremost about change. This change can involve products, processes, organizations, or institutions. Thus, the Schumpeterian analysis is about change. According to Schumpeter:

The essential point to grasp is that in dealing with capitalism we are dealing with an evolutionary process… the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates. (1942, p. 37)

Schumpeter's focus was on the driving forces underlying the economy and ultimately generating economic performance. Schumpeter looked at economic performance through a dynamic lens and thus was particularly concerned about growth and economic development. Schumpeter, more than any of the great economists before him, viewed innovation as the driving force of progress and development. According to him:

It is therefore quite wrong… to say… that capitalist enterprise was one, and technological progress a second, distinct factor in the observed development of output; they were essentially one and the same thing or, as we may also put it, the former was the propelling force of the latter. (1942, p. 110)

However, the innovative activity driving economic progress, according to Schumpeter, was achieved only at a price; perhaps his most poignant and enduring concept is his view of creative

destruction. Just as the factory wiped out the blacksmith shop and the car superseded the horse and buggy, Schumpeter argued that incumbents will be displaced by innovating entrepreneurs. According to McCraw:

Schumpeter's signature legacy is his insight that innovation in the form of creative destruction is the driving force not only of capitalism but of material progress in general. Almost all businesses, no matter how strong they seem to be at a given moment, ultimately fail—and almost always because they failed to innovate. (2007, p. 495)

As McCraw explains, "The notion of creative destruction expresses two clashing ideas, not surprising for someone whose personal life embodied so many paradoxes" (2007, p. 3). McCraw emphasizes how the paradoxes inherent in Schumpeter seemingly shaped the development of a startlingly unique view of economics. Whereas the classical and neoclassical economists viewed the most essential tension in society as that between capital and labor, Schumpeter was prescient in focusing instead on the clash between the entrepreneurs and the incumbents dependent upon the status quo. As McCraw further points out:

[Schumpeter] knew that creative destruction fosters economic growth but also that it undercuts cherished human values. He saw that poverty brings misery but also that prosperity cannot assure peace of mind. (2007, p. 6)

Not only did Schumpeter identify a new economic force—creative destruction—that was pivotal for the functioning of capitalism and consequently economic development, but he also identified the mechanism upon which creative destruction rested, namely the entrepreneur. Schumpeter's entrepreneur served as an agent of change in the economic system; the entrepreneur was the driving force of innovation upon which economic development, growth, and progress rested. Schumpeter argued that what made the entrepreneur different from other agents in the economy was willingness to pursue innovative activity:

The function of entrepreneurs is to reform or revolutionize the pattern of production by exploiting an invention, or more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way…. To undertake such new things is difficult and constitutes a distinct economic function, first because they lie outside of the routine tasks which everybody understands, and secondly, because the environment resists in many ways. (1942, p. 13)

Without the entrepreneur, new ideas would not be pursued and implemented. The status quo would tend to be preserved at an opportunity cost of foregone innovative activity, growth, and economic development.

Schumpeter was consistent throughout his life's works about the source of economic growth, creative destruction, which entrepreneurs fueled. Where he was less consistent, generating considerable ambiguity and contention, was about the organizational form and industry structure most conducive to entrepreneurs and innovative activity.

In his 1911 treatise, Theory of Economic Development, Schumpeter proposed a theory of creative destruction, in which he was unambiguous about the organizational structure most conducive to entrepreneurs: new firms infused with entrepreneurial spirit would displace the tired old incumbents, ultimately leading to vigorous innovative activity which in turn would generate a higher degree of economic growth. As Scherer pointed out:

Schumpeter insisted that innovations typically originated in new, characteristically small, firms

commencing operation outside the ‘circular flow’ of existing production activities. To be sure, the small innovating firms that succeeded would grow large, and their leaders would amass great fortunes. They started, however, as outsiders. (1992, p. 1417)

Schumpeter’s thinking about the innovative advantage of small firms began to change by the time he published Business Cycles in 1939. Rather, he began to recognize that the link between entrepreneurship and the size and age of organizations was more nuanced than he had characterized it in his earlier 1911 book. According to Schumpeter3:

It is, of course, true that mere size is not necessarily an advantage and may well be a disadvantage. Judgment must turn on the merits of each case. But statistical evidence to the effect that smaller concerns often do better than the giants should not be uncritically accepted. The smaller concerns may now often be in the position of the new, and the giants in the position of the old firms in our model. It is held… that the big concerns… implied technological and organizational improvement when they were founded. It is not held that they retrained their advantages until the present day. Our theory would in fact lead us to expect the contrary. (1939, p. 4040)

In Capitalism, Socialism and Democracy, Schumpeter had rescinded his earlier view about the innovative efficiency of the small enterprise. He concluded that, due to scale economies in the production of new economic knowledge, not only would large corporations have the innovative advantage over small and new enterprises, but ultimately the economic landscape would consist only of giant corporations: “Innovation itself is being reduced to routine. Technological progress is increasingly becoming the business of teams of trained specialists who turn out what is required and make it work in predictable ways” (1942, p. 132).

This is not to say that Schumpeter changed his view about the underlying motivation for innovation:

Spectacular prizes much greater than would have been necessary to call forth the particular effort are thrown to a small minority of winners, thus propelling much more efficaciously than a more equal and more “just” distribution would, the activity of that large majority of businessmen who receive in return very modest compensation or nothing or less than nothing, and yet do their utmost because they have the big prize before their eyes and overrate their chances of doing equally well. (1950, pp. 73–74)

Rather, what had changed was the organizational structure best able to spark and harness entrepreneurial forces. In his earlier years, and certainly in his 1911 book, Schumpeter considered the small enterprise most conducive to the entrepreneurial spirit. But by the time he wrote Capitalism, Socialism and Democracy, he had concluded that while entrepreneurship was needed to generate the process of creative destruction, this could best be financed, organized, and harnessed within the organizational structure of the large corporation.

Thus, what changed in Capitalism, Socialism and Democracy was that Schumpeter rejected his own earlier (1911) conclusion that the organizational form most favorable to the entrepreneur was the small business. Instead, by 1942, not only was the large corporation thought to have superior productive efficiency, but Schumpeter also believed it to be the engine of technological change and innovative activity:

What we have got to accept is that [the large-scale establishment or unit of control] has come to be the most powerful engine of… progress and in particular of the long-run expansion of output

not only in spite of, but to a considerable extent through, this strategy which looks so restrictive. (1942, p. 106)

This was not only a reversal of Schumpeter's own earlier thinking but also a challenge to the prevalent view in economics. According to Scherer:

Previously it was suggested that monopolists, sheltered from the stiff gale of competition, might be sluggish about developing and introducing technological innovations, which increase productivity (reducing costs) or enhance product quality. Yet, some economists, led by the late Professor Joseph A. Schumpeter, have argued exactly the opposite; firms need protection from competition before they will bear the risks and costs of invention and innovation, and that a monopoly affords an ideal platform for shooting at the rapidly and jerkily moving targets of new technology. If this is true, then progress will be more rapid under monopoly than under competition. (1970, pp. 20–21)

The implication of the emerging dominance of the large corporation and competitive unsustainability of the small business for the viability of the model of the perfect market, and ultimately capitalism, was clear to Schumpeter: "In this respect, perfect competition is not only impossible but inferior, and has no title to being set up as a model of ideal efficiency" (1942, p. 106).

What exactly had replaced the entrepreneur-driven capitalist economy was a point of contention. Schumpeter was more pessimistic in his 1942 book about socialism replacing capitalism. He gloomily concluded that

Since capitalist enterprise, by its very achievements, tends to atomize progress, we conclude that it tends to make itself superfluous—to break to pieces under the pressure of its own success. The perfectly bureaucratic giant industrial unit not only ousts the small- or medium-sized firm and "expropriates" its owners, but in the end it also ousts the entrepreneur and expropriates the bourgeoisie as a class which in the process sands to lose not only in its income but also, what is infinitely more important, its function. (1942, p. 134)

The dominance of large, entrenched corporations fueled by a seemingly inevitable process of industrial concentration triggering an increased degree of market power and therefore requiring a countervailing public policy, as foreseen by Schumpeter, has not proven to be valid. As Scherer points out in his assessment of Capitalism, Socialism and Democracy 4 :

The book is best known for arguing that by virtue of its success in cranking out goods and services, capitalism would undermine its own social, organizational, and moral foundations, setting the stage for the ascendance of socialism. Today, as the tumultuous changes in Eastern Europe unfold, that warning appears wildly off the mark. (1992, p. 1416)

In fact, in what must be one of the greater ironies of history, the mature capitalist countries of the West have not been going through a process of concentration and centralization, as Schumpeter predicted in his later years,5 but rather a process of deconcentration and decentralization. For example, between 1958 and 1979, the share of sales in the United States accounted for by small firms (with fewer than 500 employees) fell from 52 percent to just 29 percent.6 Similarly, between 1947 and 1980, real gross national product per firm rose by nearly two-thirds, from 150,000 to 250,000. Curiously, however, within the following 6 years it dropped sharply by 14 percent, to $210,000. And the amount of employment accounted for by the Fortune 500 rose from 8 million (34 percent of total employment) in 1954 to 16 million (58% of total

employment) by 1979. However, employment accounted for by the Fortune 500 proceeded to fall to 11.9 million (40 percent of total employment) by 1991 (Case 1992).

Contrary to Schumpeter's conclusions in his later writing, systematic empirical evidence has found that small and entrepreneurial start-up firms make an important contribution to innovative activity (Audretsch 1995). The reconciliation of the 1942 Schumpeterian position with this empirical evidence lies in the notion of the knowledge filter along with the knowledge spillover theory of entrepreneurship (Audretsch and Keilbach 2007; Audretsch et al. 2006). The knowledge filter prevents or impedes knowledge accruing from investments made by incumbent firms and other organizations from actually being implemented and commercialized by that incumbent firm.

The knowledge filter impedes the spillover of knowledge and ideas, thus preventing ideas from becoming innovations in the market. That is, because of the knowledge filter, the billions of dollars poured into investments in research, science, and education do not automatically result in inventions, innovations, or new and better products.

The knowledge filter impedes knowledge spillovers and commercialization based on investments in research, science, and education and universities and scientific institutions. But universities and other public institutions are not the only places where the knowledge filter blocks investments in ideas and knowledge from becoming commercialized. The knowledge filter is at least as pervasive in the private sector as well.

For example, in Mannheim (in the state of Baden-Wuerttemberg in Germany), five young engineers at IBM—Dietmar Hopp, Hans-Werner Hector, Hasso Plattner, Klaus Tschira, and Claus Wellenreuther—developed an idea for new business software. This idea was the result of costly investment not just by IBM but also by the greater society, in terms of the education the young employees had received in Germany. When they broached the new idea with their boss and their boss's boss, however, they were turned down on the grounds that there did not appear to be a sufficient market for the new software.

The young men were so passionate about and convinced of the importance of their new idea that they tried to obtain funding to start their own company. After the three main banks in Germany—the Dresdner Bank, Deutsche Bank, and Commerzbank—turned them down, they managed to obtain start-up finance through a family connection at a local regional bank near Heidelberg, enabling them to start SAP. By 2009, the business software giant had grown to 47,578 employees in over 50 countries.

How could the decision makers at IBM have been wrong about the value of the innovations proposed by the five young engineers? The knowledge filter. New ideas, which are always the basis for innovative activity, are inherently uncertain. No one can know what outcome or value will be generated from pursuing and implementing new ideas. If this were not the case, the ideas would not really be new.

New ideas also tend to be asymmetric in that the valuation of the new idea by one person is not the same as by other people, even within the same group or organization. This was clearly the case in the example of the new idea generated by the five young engineers at IBM. They clearly placed a high value on their idea, while the parent organization, which had invested a lot of money to develop new ideas, did not.

In addition, the cost of transacting the knowledge of why a new idea is perceived to be valuable

is quite high. This is because most innovations are based on tacit knowledge, especially during the earlier stages of their development. The cost of transacting facts or information is almost zero. For example, facts such as the capital of Japan or the temperature in Geneva, Switzerland, can be transacted at virtually no cost. But transacting the beliefs underlying the valuation of a new idea that could potentially lead to innovative activity is complicated and expensive.

The high cost of transacting asymmetric knowledge and beliefs is illustrated by an incident at the Xerox Corporation during the 1970s. Xerox had made substantial investments in research and development of computer technology at its main research facility, Xerox Parc, where many of the main breakthroughs for the personal computer were made. For example, the keyboard, mouse, and screen were all developed at Xerox Parc. However, the company did not pursue commercial development of these products, based on the decision that there was no potential value associated with these inventions. When Steve Jobs saw these inventions, however, he thought they could have enormous value. These inventions, generated by expensive investments made at Xerox, were the basis for Jobs' new company, Apple, and its first product, the Macintosh.

Due to inherent uncertainty, asymmetries, and high transaction costs, it is inevitable that new ideas—whether they are generated by private companies or at universities—will get lost in the knowledge filter. However, as the examples of SAP and Apple suggest, entrepreneurship is an important mechanism that transforms those ideas that might otherwise never get used into innovative activity.

As a result of the knowledge filter, the inability of incumbent firms and organizations to completely commercialize all of the knowledge they create generates opportunities for entrepreneurs to do so by starting a new firm. Thus, entrepreneurship provides a conduit for the spillover of knowledge from the firm and transfers it to a new firm that actually innovates on the basis of that knowledge.

It may be that Schumpeter, in his later years and certainly when he wrote Capitalism, Socialism and Democracy, underestimated the key role of entrepreneurship as a conduit for the spillover of knowledge from the organization investing in and creating that knowledge to the new organization actually making the innovations. Certainly the emergence of the entrepreneurial start-up firm as an important source of innovative activity has not escaped the notice of the popular press. The Economist reported:

Despite ever-larger and noisier mergers, the biggest change coming over the world of business is that firms are getting smaller. The trend of a century is being reversed. Until the mid-1970s, the size of firms everywhere grew; the number of self-employed fell. Ford and General Motors replaced the carriage-maker's atelier; McDonald's, Safeway and W.H. Smith supplanted the corner shop. No longer. Now it is the big firms that are shrinking and the small ones that are on the rise. The trend is unmistakable—and businessmen and policy-makers will ignore it at their peril. (1989, pp. 173–174)

As Scherer concluded, "Theory and empirical evidence suggest that Capitalism, Socialism and Democracy provided faulty guidance concerning the industrial structures most conducive to technological innovation" (1992, p. 1425). Half a century after the publication of Capitalism, Socialism and Democracy, Schumpeter's vision of the industrial structure most conducive to technological progress and hence to economic growth remains both relevant and controversial. The book's publication stimulated a growing stream of theoretical and empirical research. "Most

of that research supports a conclusion that Schumpeter overstated the advantages of large, monopolistic corporations as engines of technological change" (Scherer 1992, p. 1430).

Whether Schumpeter was more correct about the organizational form most favorable to entrepreneurship and innovation in his earlier or later writings is, of course, very important. However, the point to be emphasized here is that, more than in either of the two other major economic doctrines, Schumpeterian economics asks the relevant questions that focus on innovation and entrepreneurship. The very question posed by Schumpeter, relating organizational type to innovative activity, is not even on the radar screen in the frameworks of neoclassical and Keynesian economics.

6 The role of public policy

The public policy stance toward innovation and entrepreneurship differs considerably across the three main economic doctrines. Within neoclassical economics, the role and impact of innovation are hardly noticeable. The focus of neoclassical economics is on efficiency, both in terms of production and allocation of resources for satisfying consumer demands. Neoclassical growth theory has focused predominantly on the role of investment in physical capital as the driver of economic growth. In the neoclassical model, technological change is viewed as being exogenous to what influences economic growth. The main policy instruments are (lower) taxes, such as research and development (R&D) tax credits, which are perceived to alter the incentives to invest in innovative activities. Similarly, entrepreneurship is viewed as a response to incentives. As long as there are no tax or related distortions, market forces will deliver the appropriate supply of entrepreneurship. Instead, the focus of neoclassical economics and its directives guiding public policy is on the efficacy of markets. Neoclassical economics has a market orientation, not an innovation or entrepreneurship orientation.

The focus of Keynesian economics is on restoring economic output to levels compatible with full employment. The main policy target is the (aggregate) demand side of the economy. The main policy instruments are fiscal and monetary policy. The policy focus on aggregate demand assumes that supply will respond to demand. Thus, there is little attention paid to the role or impact of innovation.

By contrast, innovation and entrepreneurship are the primary focal points in Schumpeterian economics. Innovative activity is the key to the economy, and entrepreneurship is a fundamental behavior upon which innovation is based. Neoclassical economics considers market entry an important economic phenomenon because of its equilibrating impact. Supply will be increased. Entry is about business as usual, only there is more of it. However, viewed through the Schumpeterian lens, entry is important for exactly the opposite reason. It serves to disequilibrate markets through the process of creative destruction. Entry is about change; the entrepreneur who is behind the entry serves as the key agent of change.

The role for public policy in Schumpeterian economics is to facilitate investment in knowledge-creating activities, such as research and education, and to encourage agents of change, or entrepreneurs, to innovate. This leads to a markedly different set of policy targets and instruments than those of neoclassical and Keynesian economics. Policy targets include universities, scientists, schools, and research institutions, as well as nascent entrepreneurs. Policy instruments include funding for research and science, but also funding to start new businesses

and become an entrepreneur. Examples of such policy instruments include the Small Business Innovation Research (SBIR) program in the United States (Link and Scott 2010), as well as a myriad of incubators, science parks, and technology transfer programs at universities.

7 Conclusions

This paper has tried to reconcile the seemingly chaotic public policy debate involving economics and innovation by linking the different policy perspectives to their underlying economic doctrine. Public policy to promote entrepreneurship and innovation is shrouded in ambiguity. For example, in reviewing the relevancy of Schumpeterian economics to the contemporary economic scene, McCraw (2007) suggests the existence of a paradox. On the one hand, he points out that interest in the fundamental subjects of Schumpeter's work—innovation, entrepreneurship, and creative destruction—has never been greater. He provides vivid examples of how entrepreneurship and innovation have riveted the policy community and the general public across the globe. However, the public policy debate remains, not surprisingly, guided and framed by the neoclassical and Keynesian economic doctrines.

For example, the recent public policy debate about the appropriate response to the financial and economic crises has almost exclusively reflected Keynesian thinking, advocating a very large stimulus policy instead of reduced government spending and lower taxes favored by a neoclassical approach. Noticeably absent has been the Schumpeterian view, which would place the policy priority on innovation and entrepreneurship.

As McCraw (2007) emphasizes, contemporary economics gives scant notice to the work of Schumpeter. As Baumol pointed out, "The theoretical firm is entrepreneurless—the Prince of Denmark has been expunged from the discussion of Hamlet" (1968). According to Baumol:

There is one residual and rather curious role left to the entrepreneur in the neoclassical model. He is the invisible and non-replicable input that accounts for the U-shaped cost curve of a firm whose production function is linear and homogeneous. (1968)

Public policy reflecting Schumpeterian economics is most relevant in responding to the challenges of globalization. The role of public policy in Schumpeterian economics generally reflects the importance of entrepreneurial start-ups in generating innovation, economic growth, and competitiveness in globally linked markets. For example, Romano Prodi, former president of the European Commission, proclaimed that the promotion of entrepreneurship was a central cornerstone of European economic growth policy:

Our lacunae in the field of entrepreneurship needs to be taken seriously because there is mounting evidence that the key to economic growth and productivity improvements lies in the entrepreneurial capacity of an economy. (2002, p. 1)

With the 2000 Lisbon Proclamation, the European Council made a commitment to becoming not only the leader in knowledge per se, but also the global entrepreneurial leader in order to ensure prosperity throughout the continent.

Europe was not alone in focusing on entrepreneurship as key to generating economic growth. From the other side of the Atlantic, Mowery observes:

During the 1990s, the era of the "New Economy," numerous observers (including some who less than 10 years earlier had written off the U.S. economy as doomed to economic decline in the

face of competition from such economic powerhouses as Japan) hailed the resurgent economy in the United States as an illustration of the power of high-technology entrepreneurship. The new firms that a decade earlier had been criticized by such authorities as the MIT Commission on Industrial Productivity for their failure to sustain competition against large non-U.S. firms were seen as important sources of economic dynamism and employment growth. Indeed, the transformation in U.S. economic performance between the 1980s and 1990s is only slightly less remarkable than the failure of most experts in academia, government, and industry, to predict it. (2002, p. 1)

Similarly, Bresnahan and Gambardella point out:

Clusters of high-tech industry, such as Silicon Valley, have received a great deal of attention from scholars and in the public policy arena. National economic growth can be fueled by the development of such clusters. In the United States the long boom of the 1980s and 1990s was largely driven by growth in the information technology industries in a few regional clusters. Innovation and entrepreneurship can be supported by a number of mechanisms operating within a cluster, such as easy access to capital, knowledge about technology and markets, and collaborators. (2004, p. 1)

In the United States, the dominance of neoclassical and Keynesian economics has clearly shaped the public policy debate about how to move the country forward. On the one hand, the public policy community is aware of the key role played by innovation and entrepreneurship in the era of globalization. Both major political parties claim that they are advocates of innovation and entrepreneurship. For example, George W. Bush suggested:

Seventy percent of the new jobs in America are created by small businesses. I understand that. And I have promoted during the course of the last four years one of the most aggressive, pre-entrepreneur, small business policies…. And so in a new term, we will make sure the tax relief continues to be robust for our small businesses. We'll push legal reform and regulatory reform because I understand the engine of growth is through the small business sector.

Even though the roles and impact of entrepreneurship and small businesses can be understood only through the lens provided by Schumpeterian economics, President Bush was resorting to the policy instruments consistent with neoclassical economics.

On the other hand, the awkwardness of linking the dynamic performance of entrepreneurship and innovation through neoclassical economics' static lens was also apparent in President Obama's attempt to reconcile the success of Apple CEO and entrepreneur Steve Jobs to the public policy priority of creating jobs and sustaining the middle class.

A major reason why the valuation of innovation and entrepreneurial activity is shrouded in mystery is that the entrenched economic thinking reflects the two major doctrines—neoclassical economics and Schumpeterian economics—that give these forces short shrift. By contrast, the basis for understanding and analyzing the impact and role of innovation and entrepreneurship has its roots in the least visible of the triad of economic doctrines—Schumpeterian economics. Until a bridge can be forged between the underlying intellectual framework for economic policy and the actually policy concern focusing on entrepreneurship and innovation, public policy towards entrepreneurship and innovation is likely to remain burdened with ambivalence and ambiguities.

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Footnotes

1 The focus of this paper is on the former, although we address the latter in Audretsch and Link (2012).

2 This paper draws on Atkinson and Audretsch (2010).

3 Quoted from Scherer (1992), p. 1417.

4 In fact, Schumpeter himself backed down from making any specific predictions about the inevitable demise of capitalism and emergence of socialism. In his presidential address at the annual meeting of the American Economic Association, Schumpeter (1950, p. 447) cautioned, “I do not ‘prophesy’ or predict it… (F)actors external to the chosen range of observation may intervene to prevent… consummation.” (Quoted from Scherer 1992).

5 For a careful analysis of Schumpeter’s prediction that capitalism could not survive, see Scherer (1992).

6 Quoted from Business Week, Bonus Issue (1993, p. 12).